The type of roof which should be chosen—ascending, descending or horizontal—will depend upon the result which is desired from the furnace.

1. A horizontal roof will give a high temperature at the firebox end of the hearth and a low temperature at the rear end of the furnace.

2. If a higher temperature is desired near the firebox end of the furnace, and a diminishing temperature toward the rear end, the descending roof should be used. The firebox end will form a high chamber, in which the flaming gases will remain for a short period of time and where they will complete their combustion. The hot products of combustion will drop below the hotter flame, and as they gradually give off their heat and become cooler, will descend in horizontal layers. The coolest gases will pass from the heating chamber by means of the waste gas port in the hearth of the furnace.

3. In certain cases it is necessary to maintain a uniform temperature throughout the length of the furnace; it is then necessary to use an ascending roof.

In the author's personal practice the following case came up for analysis: two steel boxes for the annealing of steel sheets were heated upon the hearth of a furnace. The first box heated much more rapidly than the second box, and the annealing of the sheets was accomplished at a temperature which was much too high. This peculiarity of the furnace caused considerable trouble to the plant, and it was impossible to hold back the annealing of the first box so that the annealing of the second box would be completed at the same time. The furnace was changed so that the annealing of both boxes was completed at the same time and temperature, by replacing the descending roof of the furnace by a horizontal roof. This was done because the author had a ground-

less fear, at this time, of making an ascending roof, which would have carried the total mass of the hot gases to the rear end where they would have distributed themselves very effectively and uniformly throughout the full length of the furnace.

Vm. VELOCITY IN INVERTED WEIRS. RATIONAL CONSTRUCTION OF FURNACES OF THIS TYPE

Yesrnann's formula provides a method of computing the normal velocity of the current of hot gases in an inverted